

985,385.

Fig. 2.

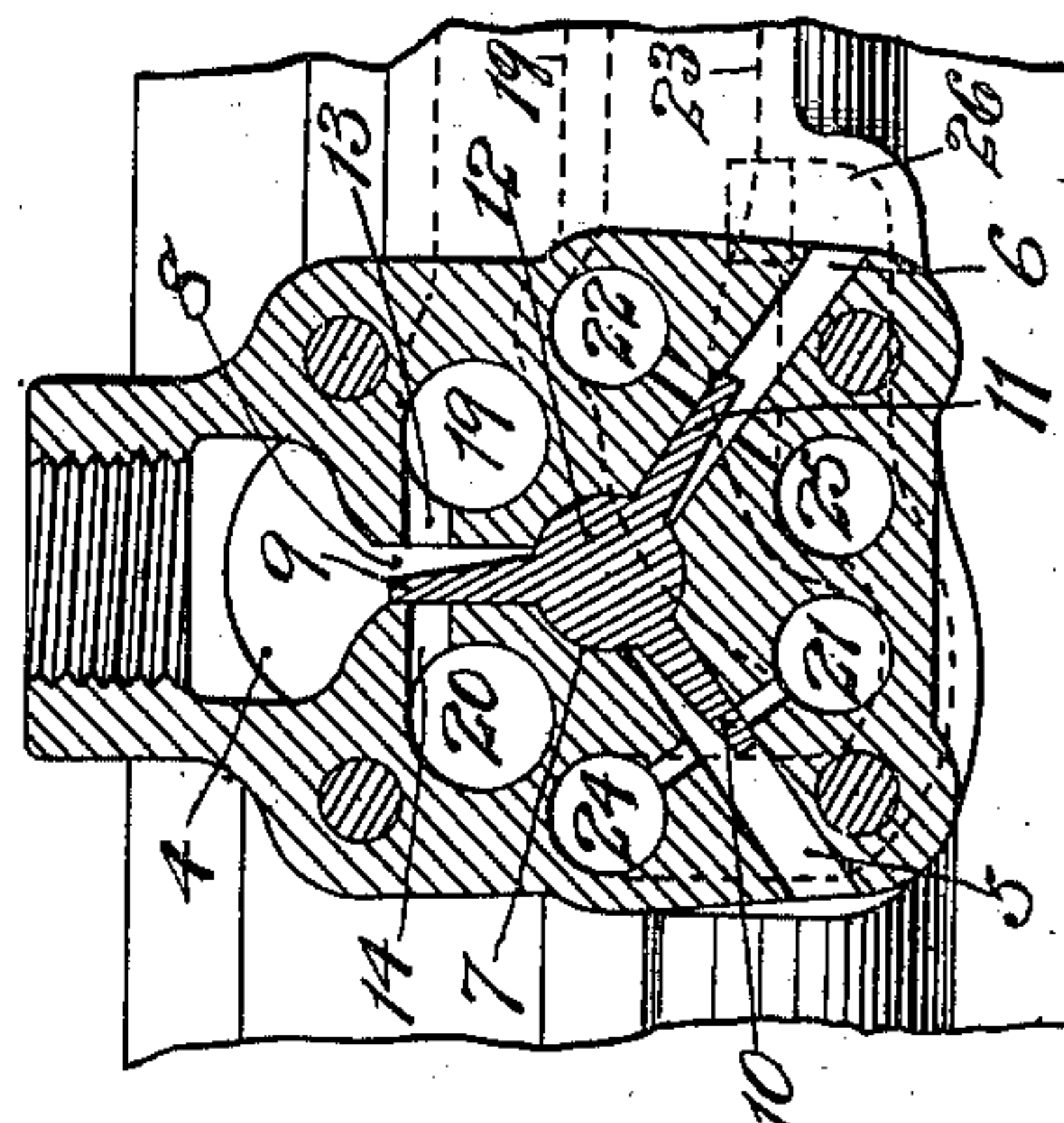


Fig. 4.

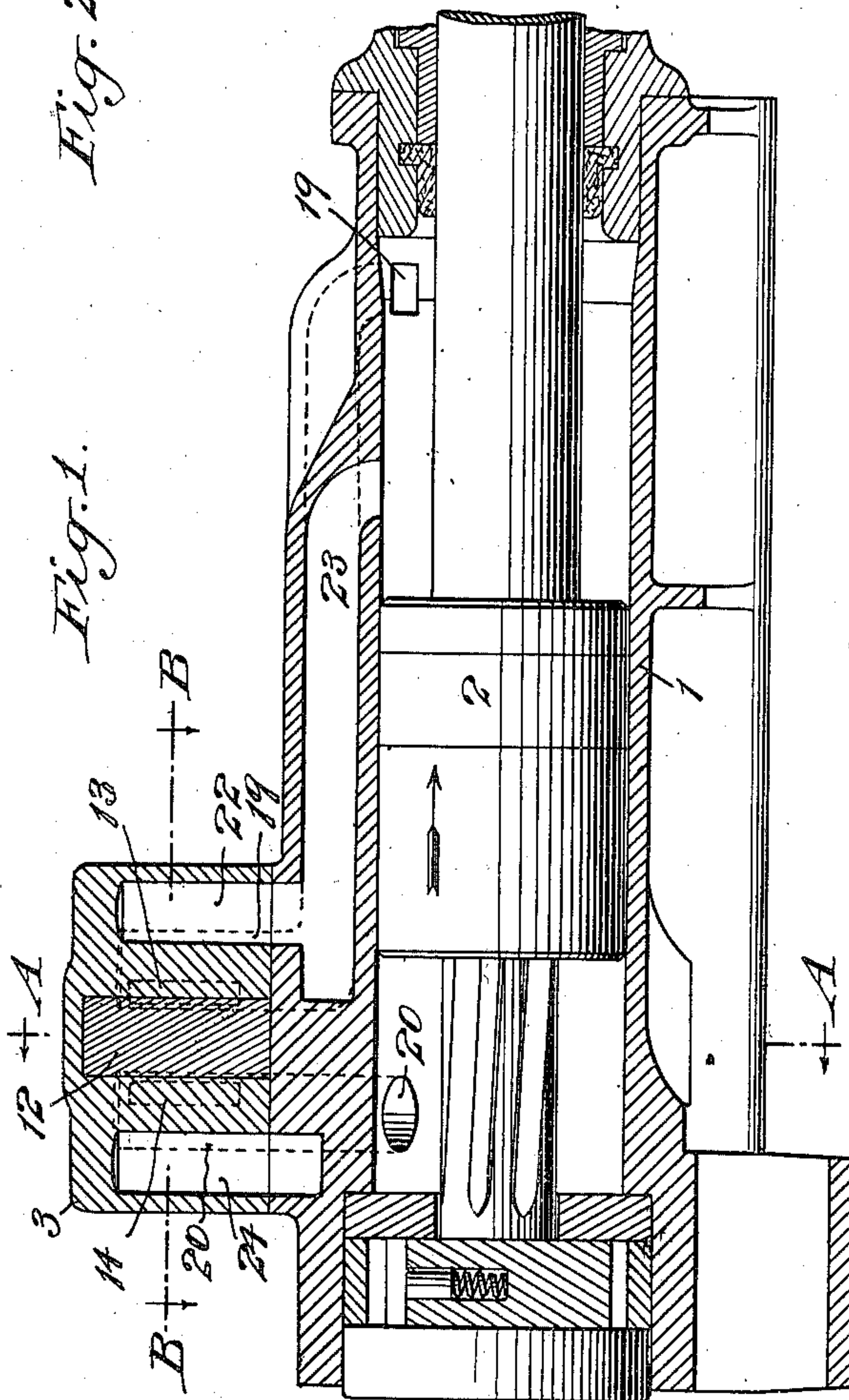


Fig. 1.

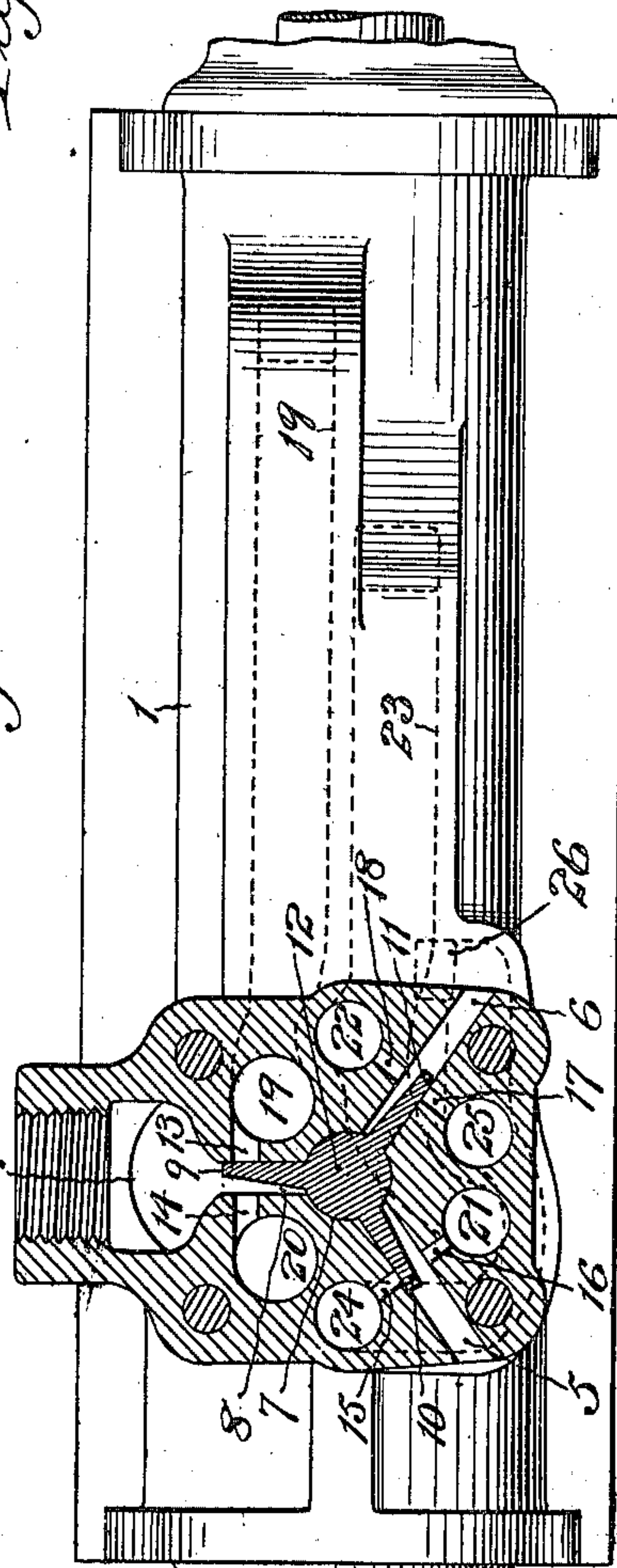


Fig. 3.

Inventor:-  
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by his attorneys  
Brown & Howard



# UNITED STATES PATENT OFFICE.

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## VALVE-MOTION FOR ROCK-DRILLS.

985,385.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed February 1, 1910. Serial No. 541,290.

**REISSUED**

*To all whom it may concern:*

Be it known that I, LEWIS C. BAYLES, a citizen of the United States, and resident of Johannesburg, Transvaal, have invented a new and useful Valve-Motion for Rock-Drills, of which the following is a specification.

This invention relates to a valve motion for rock drills and has for its object to provide certain improvements in the construction, form and operation of the valve mechanism whereby a valve may be employed which is very simple in construction, positive in its action and which has a very slight movement to accomplish the alternate opening and closing of the inlet and discharge passages for the opposite ends of the piston chamber, the action of the valve being automatic.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents in longitudinal central section so much of a rock drill as will give a clear understanding of my invention, Fig. 2 is a section taken in the plane of the line A—A of Fig. 1, looking in the direction of the arrows, Fig. 3 is a top plan view of the cylinder, the valve chest being shown in horizontal section taken in the plane of the line B—B of Fig. 1, and Fig. 4 is a detail view similar to Fig. 3, with the valve in its position opposite to that shown in Fig. 3.

The cylinder of the rock drill is denoted by 1 and its piston by 2. The valve chest is denoted by 3, which valve chest is provided with a motive fluid inlet chamber 4 and outlet chambers 5, 6. Intermediate the inlet and outlet chambers is located a vertical cylindrical chamber 7, from the face of which chamber a slot 8 leads to the inlet chamber 4. The outlet chambers 5, 6, also lead from the face of this chamber 7.

A triple winged valve 9, 10, 11, 12, has its cylindrical body portion 12 fitted to the cylindrical chamber 7, its wing 9 projected into the slot 8 and its wings 10, 11, into the chambers 5 and 6. The width of the slot 8 and the chambers 5 and 6 and the thickness of the wings 9, 10, 11, are such that the valve is permitted a slight oscillatory movement for bringing the opposite faces of the wing 9 alternately into engagement with

valve seats for the inlet ports 13, 14; the opposite faces of the wing 10 alternately into engagement with the seats for the exhaust ports 15, 16, and the opposite faces of the wing 11 alternately into engagement with the valve seats for the exhaust ports 17, 18. The port 13 opens into the fluid inlet passage 19 which leads to the front end of the cylinder chamber and the port 14 opens into the inlet passage 20 which leads to the back end of the cylinder chamber. The ports 16 and 18 open into branches 21, 22, of a discharge passage 23 leading to the front end of the cylinder chamber and the ports 15, 17, open into branches 24, 25, of a discharge passage 26 leading into the back of the cylinder chamber.

Presupposing the parts to be in the position shown in Figs. 1, 2 and 3, with the piston 2 traveling in the direction shown by the arrow thereon, the wing 9 of the valve has opened the motive fluid inlet passage 20 to the main inlet chamber 4 and has closed the motive fluid passage 19. At the same time, the wings 10 and 11 have opened the branches 21, 22, of the discharge passage 23 to the external atmosphere through the chambers 5 and 6 and these wings 10 and 11 have, at the same time, closed the branches 24, 25, of the discharge passage 26. As the piston 2 nears the limit of its forward movement, it will first close the discharge passage 23 and for the balance of its forward movement will compress the motive fluid in the passage 19 sufficiently to throw the valve over into the position shown in Fig. 4, thus opening the motive fluid inlet passage 19 to the main inlet chamber 4 and opening the fluid discharge passage 26 to external atmosphere and, at the same time, closing the inlet passage 20 and the discharge passage 23. This will start the piston on its return movement and as it nears the limit of its return movement it will first disclose the discharge passage 26 and then compress the fluid sufficiently in the inlet passage 20 to throw the valve back to the position shown in Fig. 3. It will thus be seen that the valve and ports, constructed and arranged as herein set forth, permits the valve to control the opening and closing, not only of the inlet passages but also of the discharge passages so as to insure a sufficient overbalancing of pressure upon the valve.



wings to throw the valve automatically at the desired times to insure the proper reciprocation of the piston.

While I have shown this valve mechanism in connection with a rock drill, it is to be understood that I do not wish to limit myself to such use but contemplate its use wherever applicable in percussive machines or tools.

10 What I claim is:—

1. A cylinder having inlet and discharge passages, its piston, a valve chest and a valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to control the opening and closing of both the inlet and discharge passages when the valve is at the limits of its movements.

20 2. A cylinder having inlet and discharge passages, its piston, a valve chest and a valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to open and close both the inlet and discharge passages when the valve is at the limits of its movements.

30 3. A cylinder having inlet and discharge passages, its piston, a valve chest and an oscillating valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to control the opening and closing of both the inlet and discharge passages when the valve is at the limits of its movements.

40 4. A cylinder having inlet and discharge passages, its piston, a valve chest and an oscillating valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to open and close both the inlet and discharge passages when the valve is at the limits of its movements.

45 5. A cylinder having independent inlet and discharge passages for both ends, its piston, a valve chest and a valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to control the opening and closing of both the inlet and discharge passages when the valve is at the limits of its movements.

55 6. A cylinder having independent inlet and discharge passages for both ends, its piston, a valve chest and a valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to open and close both the inlet and discharge passages when the valve is at the limits of its movements.

60 7. A cylinder having independent inlet and discharge passages for both ends, its piston, a valve chest and an oscillating valve

comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to control the opening and closing of both the inlet and discharge passages when the valve is at the limits of its movements.

8. A cylinder having independent inlet and discharge passages for both ends, its piston, a valve chest and an oscillating valve comprising a central body portion and a plurality of wings projecting outwardly beyond the body portion, said wings being arranged to open and close both the inlet and discharge passages when the valve is at the limits of its movements.

9. A cylinder, its piston, a valve chest, a valve comprising a central body portion and a plurality of wings projecting therefrom, and inlet and discharge passages opening to the faces of the valve wings arranged to be opened and closed thereby.

10. A cylinder, its piston, a valve chest having independent inlet and discharge passages for both ends of the cylinder and a fluid-actuated valve comprising a central body portion and a plurality of wings projecting outwardly from the body portion arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder.

11. A cylinder, its piston, a valve chest having independent inlet and discharge passages for both ends of the cylinder and a fluid-actuated valve comprising a central body portion and a plurality of wings projecting outwardly from the body portion arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder, and close the other inlet and discharge passages.

12. A cylinder, its piston, a valve chest having independent inlet and discharge passages for both ends of the cylinder and a fluid-actuated oscillating valve comprising a central body portion and a plurality of wings projecting outwardly from the body portion arranged to simultaneously open the inlet passage for one end of the cylinder and the discharge passage for the other end of the cylinder.

13. A cylinder, its piston, a valve chest having independent inlet and discharge passages for both ends of the cylinder and a fluid-actuated oscillating valve comprising a central body portion and a plurality of wings projecting outwardly from the body portion arranged to simultaneously open the inlet passage for one end of the cylinder and the discharge passage for the other end of the cylinder, and close the other inlet and discharge passages.

14. A cylinder, its piston, a plural winged valve, a valve chest, and independent inlet and discharge passages for both ends of the



cylinder opening to the faces of the valve wings, said valve being arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder.

15. A cylinder, its piston, a plural winged valve, a valve chest, and independent inlet and discharge passages for both ends of the cylinder opening to the faces of the valve wings, said valve being arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder, and close the other inlet and discharge passages.

16. A cylinder, its piston, a plural winged oscillating valve, a valve chest, and independent inlet and discharge passages for both ends of the cylinder opening to the faces of the valve wings, said valve being arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder.

17. A cylinder, its piston, a plural winged oscillating valve, a valve chest, and independent inlet and discharge passages for both ends of the cylinder opening to the faces of the valve wings, said valve being arranged to simultaneously open the inlet passage for one end and the discharge passage for the other end of the cylinder, and close the other inlet and discharge passages.

18. A cylinder, its piston, a valve chest having independent inlet and discharge pas-

sages for both ends of the cylinder and a three-winged oscillating valve having one wing arranged to alternately open and close the inlet passages and the other wings arranged to alternately open and close the discharge passages.

19. A cylinder, its piston, a valve chest, independent inlet and discharge passages for both ends of the cylinder having ports opening into the valve chest and a valve arranged to open and close said ports by a movement substantially perpendicular to the faces of the ports.

20. A cylinder, its piston, a valve chest containing a valve chamber having three radially disposed slots, one communicating with the motive fluid inlet and the other two with external atmosphere, inlet passages for both ends of the cylinder leading to the inlet slot, discharge passages for both ends of the cylinder leading to the exhaust slots, and a three-winged oscillating valve seated in the valve chamber with its wings located in said slots for alternately opening and closing the inlet and discharge passages.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 26th day of January 1910.

LEWIS C. BAYLES.

Witnesses:

F. GEORGE BARRY,  
C. S. LUNDGREN.